

39988

OFFICIAL USE ONLY

JPRS: 4653

29 May 1961

CZECHOSLOVAK REPORT ON THE SIGNIFICANCE OF MENTAL
HYGIENE IN ASTRONAUTICS

By Jiri Semotan

CONFIDENTIAL

Reproduced From
Best Available Copy

DISTRIBUTION STATEMENT A
Approved for Public Release
Distribution Unlimited

19990709 088

U. S. JOINT PUBLICATIONS RESEARCH SERVICE
1636 CONNECTICUT AVE., N.W.
WASHINGTON 25, D. C.

OFFICIAL USE ONLY

F O R E W O R D

This publication was prepared under contract by the UNITED STATES JOINT PUBLICATIONS RESEARCH SERVICE, a federal government organization established to service the translation and research needs of the various government departments.

OFFICIAL USE ONLY

Existing laws relating to copyright make necessary that this text be restricted to the official use of the U. S. Government. Copyright by State Medical Publishing House, Prague, 1961.

JPRS: 4653

CSO: 1768-S/4

CZECHOSLOVAK REPORT ON THE SIGNIFICANCE OF MENTAL
HYGIENE IN ASTRONAUTICS

[Following is the translation of an article by Jiri Semotan in
Ceskoslovenska Psychiatrie (Czechoslovak Psychiatry),
Vol XVIII, No 1, Prague, February 1961, pages 61-67]

The problems dealing with the sending of man into interplanetary space, the fulfillment of all his tasks within this situation as well as his return with the possibility of use of all the information gained relate closely to the questions of the optimum living conditions for the human organism within the specific environment of such a flight.

One cannot wonder, therefore, about the special stress on biological sciences in astronautics, which is a science that coordinates all the scientific disciplines necessary for the fulfillment of this significant task. Among these biological sciences is evolving a new branch of contemporary medicine -- cosmic medicine. Its task must be the care for the health of the future astronaut, directed not only to the possibility of a simple preservation of life, but also to assurance of such health conditions as would preserve his complete ability to perform his tasks under especially difficult conditions, during the start, flight, and return, as well as after the completion of the flight. Here also belong the prevention of damage to his health which could, after his return from cosmic space, manifest itself as a disease due to this specific profession.

In order to reach this goal in all its extent, cosmical medicine needs to proceed on the basis of the basic biological principle of the psycho-physical unity of man. From this there follows an uncompromising requirement of an equivalent care, in the physical as well as mental sphere, of the health of the cosmic fliers; thus here belong the tasks of psychiatry and mental hygiene.

The significance of mental hygienic problems within the entire action is continually emphasized, and it is therefore necessary to place the mental health factors in the foreground of astronautical research.

OFFICIAL USE ONLY

If we emphasize within astronautics mental hygiene as a separate department which is oriented not only toward the maintenance of mental health, but also toward strengthening of mental health and the prevention of mental disorders, we have to proceed from a wider concept based on the findings the higher nervous activity [vyssi nervosni cinnost, VNC].

Mental hygiene should aid in the discovery of ways to maintain a harmonious course of VNC, an uninterrupted regulation of the entire system of the organism, preservation of all the abilities of the astronaut which are essential for the operation of the entire technical equipment of a space-craft, and the gathering of new information gained from the particular action, as well as to preserve the moral and social values.

It is necessary here to remember that VNC, as far as phylogenetic and ontogenetic development is concerned, is formulated on the basis of existential conditions for life on earth and is thus limited in its possibilities and in the boundaries of its adaptability. It is, of course, necessary to view this adaptability dynamically, with an eye to the possibility of a further expansion in breadth and depth.

As in aviation and often also in sport medicine, it is necessary to consider here not only general factors, but also factors which have an individual significance as well gradual dynamic influence of external phenomena even when these are less usual. One also has to take into consideration those factors which are not known as yet at this time.

All this has special significance for the possibility of an effective function of VNC outside the sphere of our planet.

When we think of the activity of the future astronaut we realize that one has to count, even in the case of an advanced automatization, on a great mental tension. The majority of scholars agree that the main characteristic of such a work will be, above all, a considerable stress on the highest nervous regulational mechanisms.

Thus mental hygiene, actually hygiene of VNC, is becoming justified from the practical view of astronautics. The sending of man into space demands, therefore, that we concern ourselves not only with his existence, but also with the successful completion of his mission and a safe return to earth.

If we consider here the usual stimuli of our world which act upon the nervous system, overwhelmingly influencing the activity of the human organism, we see that in the cosmic environment, completely new to man, their quality, quantity and frequency will change and will often appear in maximal values in the sense of either their reduction or their increase, as well as in the sense of the alternation of these maximal values. These changes will certainly have a profound influence on the VNC. Of course, even here a number of new, strong acting factors in the biological sense will influence the CNS (central nervous system) directly or indirectly, and we will encounter also a number of important psychological factors. Their mutual interaction and sometimes a summary action will have a strong influence. At other times the influence of these factors in relatively small quantities, but acting over an extended period of time will accumulate in an even more treacherous

OFFICIAL USE ONLY

form. On the other hand, one has to keep in mind the complete neuro-physical terrain of the future cosmic flier, with his compensative and adaptative abilities obtained through a number of various internal and external dependencies, among which the time factor will hold an important position; often effects, acting together, will become the source of sensitization, potentiality or even the weakening acting mutually.

Especially during the start and during the return of the cosmic craft, these relations will be very weighty, capable of fast change or of mutual combination. Even though the attainment of interplanetary space will mean a certain stabilization of the conditions of the flight, the considerable reduction of external stimuli will still act quite adversely, as will the appearance of eventual new factors.

In considering the load of the CNS in the cosmic environment and its consequences, one will have to proceed on the basis of the findings of aviation medicine in the widest sense, including aviation psychiatry and mental hygiene; further on the basis of the findings of the equally extensive marine medicine, labor medicine and general psychiatry, psychopharmacology, research in model psychoses, psychology, above all applied psychology, and finally the results of tests in a simulated environment used with animals and volunteers as well as the present day stratospheric experiences.

On the other hand, experiments undertaken within the framework of astronautics can add much towards the clarification of the genesis of many forms of damage to the VNC as well as toward their prevention.

The task of this discussion is to touch as concisely as possible on the most basic problems, to show the importance of this scientific branch, and to turn attention on it.

Now to get to the discussion of the successive factors acting upon the VNC during cosmic flights:

First of all we have the significance of a sufficient supply of oxygen within the atmosphere of the cosmic craft. It is well known that an acute lack of oxygen leads swiftly to unconsciousness, even death. Thus in the case of a sudden event, like damage to the craft by meteorites, such a catastrophe can occur very swiftly and there is need for fast action. Much more treacherous, however, is a protractedly acting hypoxia which can show up very importantly in the psychic sense within the affective, intellectual and psychomotoric coordination spheres. The beginning can be compared to alcoholic poisoning, which is joined by euphoria with a heightened self-confidence with a loss of initiative and indifference to former interests of work and can result in a complete reversal of action. Gradually there appears a loss of intellectual ability, judgement and memory. The victim is not aware of this change in personality. In the case of a timewise, very slow progress of the oxygen loss, this euphoria then changes into a resonant mood of aggression, or, conversely, of depression and anxiety. In a longer exposure, sensory perception weakens and the thought process becomes ever more incoherent. Sleepiness, with continuous quantitative damage to consciousness, even unconsciousness, develops. It is necessary to further emphasize the heightened suggestibility during the beginning stage which can

OFFICIAL USE ONLY

be used positively for the transmittal of emergency orders from earth, i.e., to get the astronaut to increase his supply of oxygen, as has been proven in aviation experience.

Individual resistance to the lack of oxygen is governed by the character of the neuro-physical terrain. Hyperoxia is another extreme of this danger and produces above all a deadening of the CNS after a certain period of time. The general condition of the atmosphere inside the space craft belongs to the climatization and recyclization.

Among biologically injurious substances which endanger the CNS is, for example, CO because the recyclization of oxygen from CO₂ is not yet completely solved, and there is still danger of small quantities of CO remaining, and finally also its origin from other sources. We should remember here the evoking of heightened fatigue changing into a state of psycho-motoric deadening, anxiety, decrease of memory, and gradual muffling of intellectual functions. Gradually there can evolve even a feeling of persecution and hallucinations. Headache and other difficulties, mainly digestive, and a decline of the digestive function follow. Nor should we forget the rise of mental damages related to lasting poisoning or the belated changes after a long intoxication. All this can create very dangerous situations.

Another problem is the concentration of CO₂ and other gases within the atmosphere of the space vehicle, which cannot be discussed within this format. Their limitation to an acceptable concentration is the special task related to the production of an enclosed ecological system for the space vehicles.

Among other important damaging factors, we have the noise, including infra-noise, ultra-noise and vibrations. As far as the damaging effects of noise as an acoustical phenomenon is concerned, it is necessary to stress not only its quantity but also its quality. Usually we consider only the injuriousness of noise at a high level of intensity which acts adversely on the hearing organs, or of noise of high frequency which acts painfully. Only in recent time has stress been put on the unsettling effect that noises of smaller intensities have on the activity of the CNS. On the basis of Lehmann's experiments, tested in practice, it is necessary to distinguish three zones of noise according to their level of intensity.

The first zone extends up to 30 decibels and signifies the most suitable biological range for man. Within the zone up to 65 decibels belong mainly those psychological moments connected with an emotional individual relation to the source of the noise or to some of its objective characteristics, above all its oscillating frequency composition. Even this zone cannot be overlooked within the cosmic environment because it is accompanied by changes in the emotional sphere, i.e., various moods, heightened fatigue, etc., and functional physical defects. The establishment of habit under suitable conditions would be possible within this zone, but it is not definite nor universal.

Above 65 decibels we encounter, besides the psychological moment, mostly the intensity. Penetrating changes in the VNC and vegetative defects evolve here much faster, also in the case when the person seems to have grown used to the noise. A chronic effect of noise can lead to a considerable

OFFICIAL USE ONLY

asthenization of the nervous system, manifesting itself by rapidly developing tiredness and growing oversensitivity to noise. Gradually there can develop even a neurasthenic syndrome with mental defects of hypersthenic and hyposthenic character, along with a wide number of vegetative disorders, mostly in the circulatory and digestive tracts.

Above 95 decibels there appear disorders of the middle ear, and above 130 decibels the noise is felt as a pain and the changes of the VNC appear very fast, similarly as the damage to the hearing organs.

Another damaging factor are the vibrations which also tend to damage the VNC, either directly or indirectly, with consequent functional changes in the rest of the organism. The defects within the VNC, as in the case of the noise itself, then have an adverse influence on the performance and security of the flier. One should also mention in relation to the vibrations the uncomfortable and painful sensations, which have a further psychological echo.

Through the influence of ultrasound, there evolves a special mood of annoyance, failure to concentrate, which is sometimes connected with psychomotor restlessness and a strange feeling of uneasiness. Infrasound calls forth a special kind of deep tiredness, also with sensory disorders and alterations of thought processes.

Another adverse factor which affects the CNS is the high temperature, especially where the neuro-biological terrain had been sensitized by some external or internal injurious effect. Overheating of the capsule threatens mainly during the return of the cosmic missile. Heat tends to evoke tiredness, lassitude, and affective lability with damage to concentration. During a high level of heat, there appear, according to present experience, even fainting and delirious states and unconsciousness. These disorders are accompanied by various vegetative manifestations. Heat also lowers the tolerance of overload. A contrary factor, likewise acting adversely, is too low a temperature.

The changes in weight, which are typical in cosmic flights, have an important influence. The influence depends on the quantity, period of time, and direction of the function of such changes.

Overload during acceleration at the start, which acts within the head-pelvis axis, influences the decrease of the blood supply to the brain. Quickly ensuing uneasiness can develop through defects in the psychomotoric coordination into somnolence and even unconsciousness. In the case of an opposite position the growing over-supply of blood to the brain can lead to disorders of orientation, to a psychomotor restlessness and even to bleeding into the brain. Even in the case of the optimal prone position, after some time, there appear during the progressive weakening of the central nervous system disorders of orientation and thinking. The VNC is progressively disturbed, which is accompanied by total exhaustion.

Even during a short period of weightlessness, disorders in orientation and psychomotor coordination develop.

Extensive statistics show that during the state of weightlessness about one half of the cases experienced a feeling of euphoria, enthusiasm, and of a general relaxation, actually of some kind of special gaiety. About 25% of the volunteers suffered slight vertigo and an uneasiness with a strange

OFFICIAL USE ONLY

sense of falling, connected with a disorder in the determination of the position of the body or of extremities, even depersonalization effects, and about 25% suffered a serious uneasiness and need to vomit. Also there appeared optical illusions which led to disorders in orientation, and even to a complete disorientation.

During the state of weightlessness there appears a reduction of exteroceptive stimuli, including labyrinth, proprioceptive and interoceptive stimuli. One cannot count on the substitution of labyrinth stimuli by visual stimuli, and thus there is often a disturbance of spatial orientation. Of course, during this state there can develop, through the influence of a reduction of afferent stimuli from various sense organs also postural illusions. One could reach correct orientation if the astronaut could lean on some horizon, even an artificial one.

Vertigo which develops here is actually a dynamic form of disorientation which evokes a false sensation of movement. It is supported also by psychic factors like anxiety which is caused by the change in the entry of stimuli. Much depends on how fast the transition was from the state of loss of weight into complete weightlessness. In the case of a protracted weightlessness, the ability to bear the later acceleration is impaired from the psychic as well as the somatic point of view.

In the case of a shorter state of weightlessness one can count on a considerable adaptability in more resistant individuals, which can be cultivated through training. Sudden acceleration after the state of weightlessness tended to evoke considerable uneasiness and even a fogging of consciousness. All these changes demonstrated themselves sooner and more intensively in cases where there was a former influence of noise, vibrations, etc.

Even various smells have an important influence on the CNS. Up to now, research in this direction is still in the diaper stage, but it is necessary to study this problem, as is evident from experiments in isolation cabins. The case of touch perception is similar.

An especially difficult situation during cosmic flight will be the complete isolation and separation from the earth and the dependence on various safety and technical aids, with the complication of a reduction in movement and reduction of sensory stimuli. To that will be added also the psychic stress evoked by the strangeness of the situation, and fear, be it conscious or unconscious, resulting from anxiety about the mastering of the given task and the overall danger of the whole mission. Further there exists the influence of the impossibility of a near or remote space orientation. Certainly there exists the possibility of origin of psychogenic reactions of various degrees and tone because of the lowered emotional stability, and this could, during the beginning of the flight prove fatal. Sometimes it manifests itself only through a lesser or greater lowering of efficiency. It is necessary to add immediately that we cannot consider the reduction of sensory afference from a narrow mechanical point of view, but that we have to take into account also the importance of the psychological moment when a lack of impulses signifies a special interruption of the relation of man to his surroundings.

OFFICIAL USE ONLY

Isolation of a person from his usual environment can have a deep influence on his psyche, as is apparent from the notes of various travellers as well as from objective psychiatric observation of members of isolated crews, arctic expeditions, submarines, and from the reports of aviators who fly at high altitudes. This separation includes various emotional disorders, from light nostalgia, over several degrees of depression to deep depression connected with suicidal tendencies and orientational disorders. Even cases of hallucinations and delirium with accompanying aggression have been recorded. In this context one knows well also mental disorders of prisoners.

The cabin of stratospheric or cosmic planes is a special kind of an artificial environment with great limitation of movement and reduction, or complete elimination, of some sensory stimuli. Basic changes of such stimuli, further complicated by the knowledge of danger and other psychic factors, become the source of stress.

Experimental isolation gave us to a certain degree a possibility of evaluation of this stress. Stay in the experimental cabin with small possibility of movement and relatively slight reduction of external stimuli lasted without interruption for several days and even weeks. In some of the cases there evolved immediately upon enclosure or after a short time a claustrophobic anxiety, which sometimes grew into true panic. Then there appeared the second phase, a period of a certain accustoming in the case of emotionally stable people, during which they created, according to individual character, a certain kind of activity. In some, this period was accompanied by a feeling of euphoria and a joyous carelessness, but with sensory disorders. In the case of longer duration, there came a third phase, characterized by anxiety and breakdown of the thought process, in individual cases even derealization and confusion. Others suffered from fear and hypochondriac complaints and phantoms.

Common isolation is endured more successfully, thanks to inter-personal stimuli, either preverbal or verbal; the same situation evolved where some contact with the surroundings or with the experimentator was retained. With further spatial limitation of movement within the cabin, there occurred a significant impairment and functional difficulties rose in comparison with experiment under normal ability of movement.

A greater load was created, however, by the use of a harness which reduced in the first place proprioceptive and exteroceptive stimulation, in the second place created a feeling of physical discomfort. Psychomotor suffering of this type was identified by the experimental volunteers as a double imprisonment and led to the origin of claustrophobic reactions. In the case of such limited afference, there evolves also quickly a derealization and depersonalization with disorders of the physical scheme, feelings of strangeness of one's own body, change in the size of extremities and in their form and even the feeling of missing the lower part of the body.

When visual stimuli were limited, there appeared an important state of fear with manifestations of increased attentional stress, accompanied sometimes with violent defensive reactions.

OFFICIAL USE ONLY

Reactions to lengthy isolation with constant lighting and considerable limitation of auditory stimuli were individual. Thus cases were recorded of increasing restlessness and aggression, sometimes regression, and in other cases a state of complete akinesia. Then hallucinations swiftly appeared and soon considerable defects of consciousness. When a whole group was isolated, they became accustomed to the situation much more quickly. Complete soundlessness is always very badly endured from the emotional point of view.

According to some authors, insufficient changeability of the supply of sensory impulses can gradually create lowered activation of reticular formation and thus bring on a disorganization of brain processes. Thus there can occur bizarre hallucinations similar to those encountered in model psychoses produced by mescaline, LSD-25, and others.

Especially hard was the isolation in those cases where time orientation was not possible. Guessing of time during the first and second day of testing was usually done by a biological "chronometer" according to the rhythm of various body functions, but later there occurred a complete "drowning within time". The hardship of isolation was endured much better where time orientation was possible.

In every case when the volunteers had, before the test, been exposed to some biological or psychic stress, their reactions appeared sooner and were more violent. Through the reduction of external stimuli the volunteers became conscious of the activity of internal organs: slight pulpitis of rheumatoid pain became unbearable suffering.

An important psycho-hygienic problem for the cosmic flier is fatigue. This reversible physiological phenomenon can during the overstepping of certain boundaries even lead to considerable changes in the highest regulational mechanisms. Well known disorders of analysis and synthesis appear soon in this case. Disorders of attention, inculcation and dispatch, spontaneity and accommodation, with loss of circumspection and more instinctive action, and of psychomotor coordination influence the whole behavior of the flier and form a tendency toward mischance action. Partiality towards work and high morale slow down the appearance to fatigue, but are not able to stem it unlimitedly.

Chronic fatigue of the nervous system without the possibility of good rest can lead through various degrees of asthenization of the CNS to neurotization. Here it is necessary to remember the so-called "fight fatigue" of pilots during the last war which originated from accumulation of fatigue and emotional stress and led to a specific state of exhaustion with nightmarish dreams which were permeated by unsolvable situations. Mental collapse came soon thereafter.

A more severe form is the so-called chronic aviation fatigue which is actually a special form of heavy neurosis. It is characterized by deeper changes of personality, manifesting themselves through the behavior of the victim, changes in behavior, emotional lability with a whole number of functional physical disorders, and a subjective experience of illness. The flier's selfconfidence and productivity is lowered. These changes can become very dangerous in view of the entire performance and can be even chronically interruptive or destructive.

OFFICIAL USE ONLY

Daydreaming is another important factor which develops in the monotonous environment from the small possibility of movement and from work which does not require complete attention, as is the case with complete automatization. Sometimes it is increased by the monotonous sound background or even by a slight hypoxia. It is a deviation from uncomfortable reality, flight from reality and the substitution of attractive wishes for the hard facts of the situation. Daydreaming can also last for a lengthy period of time and can change into a hypnagogic state with hallucinations.

The basic task of mental hygiene is certainly the selection of candidates for cosmic flights from the mental point of view. It is undoubtedly necessary to be wary of the desire on the part of the applicants to escape reality or to compensate for shortcomings, or even to become a sensation or to gain material good. They must have motivation of a high level, led by the desire to contribute to the higher knowledge for science and humanity. Nor can cosmic flight be regarded as a sport achievement, as is stressed by leading Soviet statesmen and scientists. Elimination of unsuitable candidates is certainly a responsible task and can be effective only through cooperation of a number of specialists. Necessarily a close cooperation of the psychiatrist, the psychologist and related specialists will be required.

Psychiatric clinical examination and the evaluation of anamnestical data, including detailed objective reports as to the behavior of the candidate during health and illness, at work and within social environments, examination of the VNC, detailed neurological examination, including EEG and the results of objective psychological tests and internal examination, will help in the basic decision about the suitability of the candidate. Basic demands are high intelligence with the ability to integrate readings of the instruments, to estimate mathematical relationships, to maintain spatial orientation, maintain sufficient dynamicity and productivity as well as emotional stability with the ability to stand complete isolation, and also a narrow social identification with and adaptability to unexpected situations, and the ability to adjust to the unusual environment with a high moral level of concept.

It is necessary to emphasize the importance of long term selection. It is obvious that the psychiatric examination must be repeated at the end of several weeks of intensive training, and likewise there is a need to repeat interviews and a number of psychological tests which can evaluate the candidates' reactions to stress experiments which simulate the conditions of the flight and determine their own experiences during these experiments. On this, then, rests the basic selection of candidates. At the end of this complex evaluation which can supply us with a wide picture of the dynamics of each personality, one determines the order of sequence of the future fliers. Training should be under the direction of personnel familiar with any psychological and eventual psycho-hygienic problem.

It has been determined that reactions to physical stress has had a positive correlation with psychiatric evaluation. The most stable personalities showed the best adaptation to acceleration, noise, heat, etc.

OFFICIAL USE ONLY

A responsible task will likewise be the selection of the members of small crews. The basis for this is, besides a deep concern for the expedition and its success, also high morale. Besides the adaptability of each member to his prescribed task, there will be a need, from the psychosomatic point of view, for character capable of collective solidarity, determination, lack of egotism, self-sacrifice, ability to bear collectively all the stresses, lack of hate, impulsiveness, envy and ruthlessness; we will need candidates with a highly developed sense of comradeship and friendship in every direction.

It is necessary to keep in mind that the suggestibility of a small group during isolation and under the influence of various external and internal factors is strongly developed, and that even a comparatively small neurotic effect in one of the members could in this case bring about more serious psychic disorders, and could spread from the individual to other members of the crew. On the other hand, it is necessary to maintain and develop further the positive characteristics.

Here belongs the choice of the commander. Here we need a personality with high morale who can maintain the morale of his subordinates even during conditions of stress, emotionally stable, able to maintain noncompromising decisiveness during the basic actions and calmness during a crisis. The complex dynamic personal relations between the commander and his subordinates are very important during drawn-out situations of stress. Out of this there develop the factors for the selection and training of the leaders. Such selection is difficult under purely experimental conditions and is possible only within the scope of long-time training.

A self evident psycho-hygienic demand is thorough training in the control of own work as well as of all the assisting apparatus of the space ship and training in the ability to perform all these tasks even under a situation of stress. Laboratory experience of certain such situations prevents the return of the primitive forms of reaction.

One of the important tasks will be the training in control and regulation of fear. It is especially necessary to stress that the purpose is not the suppression of fear but the use of this emotion for heightening of vigilance, quick preparedness for action and for purposeful action. Suppression of fear can, on the other hand, also evoke many undesirable reactions.

Already there are performed experiments with psychopharmatics for the prevention of disorders of the VNC of the most varied character.

Morale is an important factor and a strong mobilizer of all the adaptive and compensative mechanisms of the brain; this is a very abstract idea, but actually very real connected to the entire specialized and social education in the widest sense of the word. From the psycho-hygienic point of view, one cannot therefore neglect even the care of the life of the future fliers outside of work and of their social situation, family relationships and other, which could have decisive importance for mental health.

Selfevident is the care of physical health, which to a certain extent aids the preservation of mental efficiency. Current hygienic rules

OFFICIAL USE ONLY

are binding in this direction for a total way of life and its individual elements, for example the following of dietary prescriptions. Balanced relation of training and rest as well as of work and rest during the cosmic flight is basically important: organization of long-period rest, recesses, daily schedules, etc. Active recesses should contribute to harmonization and toning of the higher spheres of the nervous system.

All kinds of sport play an important part during the period of training.

Psycho-hygienic education has to include, in a suitable form, not only the basic explanation about the possibility of the appearance of mental disorders during the flight and their prevention, but also an explanation of the prevention of fatigue with all the possible kinds of defense against its origin.

Of course, a question of no lesser importance will be also the total arrangement of the environment of the space cabins within the space vehicles. Even during a maximal conservation of space or weight, or just because of this fact, it is necessary to remind oneself of the influence of lighting, color and correct climatization of the entire space can have on the crew.

For correct mental function we need a certain quantity, quality and changeability of sensory stimuli and of contact of the flier with his former social existence. The possibility of connection with the earth which is all-important here, has been proven during the launchings of the Soviet space ships.

Also one has to consider a number of security aids which have to be constructed in such a way that they will take into account the psychological possibilities of the organism. Of equal concern is the form of the various instruments. It is necessary to maintain a simple possibility of survey, easy visibility and lack of complicated mechanism and within the scope of possibility, esthetical form.

This short report emphasizes the importance of mental health for the total mission of the astronaut. I tried to show roughly how and when it can be endangered, and have pointed to the necessity of prevention of such danger.

The questions of mental hygiene in cosmic medicine have to be grasped in all their complexity. Its application is not only the task of psychiatry, but also of other medical branches along with close cooperation of technical workers of various scientific branches and lay circles. Only through such collective effort can we reach the goal, so difficult in its character, but equally magnificent.

Summary

The importance of the human factor in space flight is pointed out. The central nervous system (CNS) is presented in its relation to problems of mental health of the future astronaut. The role of mental hygiene in cosmic (space) medicine is justified. Attention is called to the most important somatogenic as well as psychogenic factors in the microclimate of space ships, and to the influence of these factors on the higher nervous activity (VNC).

OFFICIAL USE ONLY

Among the most outstanding specific factors influencing mental functions are weightlessness, forces of gravity, noise, ultrasound and infrasound, vibrations, isolation complicated by sensory and motor deprivation etc. Some mental disorders endangering the crew while on a space mission are analyzed in some detail. Psycho-hygienic approaches to the selection of astronauts or members of space crews are specified and advocated. Possibilities and means of preservation and development of mental health and prevention of its disturbance in astronauts and among space crews form part of the complex task of mental hygiene. Research trends in psycho-hygienic problems of space flight are outlined.

10,473

- END -

- 12 -

OFFICIAL USE ONLY